

Sample Appendix

(The following are examples of technical information to supplement the IAQ Label Specifications for New Homes)

Notes to Reviewers

The IAQ specifications will be accompanied by supplemental information in an appendix format to allow builders to readily obtain additional information they may need to implement the specifications. Examples are provided below. Comments are welcome. In some instances information is requested regarding the content or format of a specific entry.

In addition, EPA is requesting comments on two general issues concerning this Appendix:

1. In cases where climate differences may have an impact on the specification, how might this be addressed without expanding the Appendix to an unmanageable size?
2. Should line drawings be added to assist the reader in understanding the techniques? Drawings from existing technical guidance materials (with appropriate acknowledgement) could be utilized.

Sample Appendix Items

Foundation Vents: For vented crawl spaces, the minimum net vent area of foundation wall openings shall be 2 sq. ft. for each 150 sq. ft. of crawl space floor area, or double the International Residential Code for One and Two Family Dwellings 2000 (IRC) code requirement (R 408.1), of 1 sq. ft. per 150 sq. ft.

Exterior Wall Drainage Planes:

General: Drainage planes shall be provided behind all exterior wall finishes. Drainage plane membranes shall be applied over wall sheathing (i.e., rigid insulation, OSB, plywood, etc.) and terminate by covering flashing at the base of the exterior wall finish. Continuous membrane consists of minimum 15 lb. building felt (asphalt or tar felt paper), or housewrap, each lapped 6" "shingle-like" progressively up the wall, and with horizontal interruptions lapped 12". Insulated sheathing for this purpose shall have an integral water barrier and all joints shall be taped.

Stucco: Provide a double membrane (type "D" paper, 30 lb. felt, spun-bonded polyolefin, etc.) over sheathing. For synthetic stucco, provide a layer of drainage mesh between the foam and the drainage plane.

Brick: Maintain a minimum one-inch (1") between the back of brick and the drainage membrane.

Vinyl siding: Contour foam underlayments are prohibited. Special attention shall be paid to installation of door and window flashing and "J" trims to prevent water infiltration.

Fiber Cement Siding: Provide grooved foam, drainage mesh or vertical furring strips to maintain a minimum one-half inch (1/2") between the back of the siding and the drainage plane.

Pest Control- Termites:

In areas subject to termite infestations, (see Figure R 301.2 (6), International Residential Code for One and Two-Family Dwellings, 2000) incorporate the following:

- Foundation walls shall be solid concrete, or masonry block where the top course should be a bond beam or concrete-filled block. To control cracking that can provide passage for termites, concrete slabs-on-grade shall contain welded wire fabric and concrete walls shall contain reinforcing rods.
- Foundation walls shall be capped with a continuous (minimum .016 gauge) sheet metal termite shield. With brick-veneer walls, the shield shall extend from the foundation wall through to the face of the brick wall.

Preservative-treated Wood: Because of toxicity issues, one common type of treated lumber, chromated copper arsenate (CCA) is being phased out by its manufacturers and can no longer be used as sill plate material. Alternatives are available. However, the use of CCA-treated lumber in permanent wood foundation designs is still being evaluated and that use is still permitted.

Spot Ventilation Fan Sizing:

Kitchens: In all cases, provide a minimum of 150 cfm (HUD/FHA). Based on size of range/ cook top installed against a wall, provide 40 cfm fan rating per linear foot of range width (i.e. for 3-ft. range: 3 ft. x 40 cfm = 120 cfm, but increase to 150 cfm.

Bathrooms: Provide 8 air changes per hour when ventilation is needed. Based on an 8 ft. ceiling height, multiply the length and width of bathroom by 1.1 (6 ft. x 8 ft. room x 1.1 = 53 cfm.)

Laundry rooms and office equipment rooms: Provide 6 air changes per hour when ventilation is needed. Based on an 8 ft. ceiling height, multiply length and width of room by .8 (8 ft. x 10 ft. room x .8 = 65 cfm)

Garages: Provide one of two options: 1) Continuous mechanical ventilation of 50 cfm, or, 2) Intermittent ventilation for a minimum of 20 minutes, activated by operation of the overhead or roll-up garage door. Fan capacity shall be 100 cfm. per vehicle, that is, 200 cfm for a two-bay garage.

Isolation of the Garage: Garage walls (and ceilings) that are also common to living spaces should be sealed, and garage walls common to the exterior of the building should be built “loose”.

To prevent vapors or gasses from entering living spaces from the garage, all cracks and other openings in the common wall(s) separating the garage from the living spaces must be sealed. Caulk and expandable foam products should be used (before wall finish surfaces are put in place) at points where framing members do not fit tightly. Target areas are band joists; beneath sole plates and between top plates; between jacks and header materials; around electrical boxes (sealed boxes are preferred); around door frames before trim is installed; and around pipe, electrical and mechanical penetrations of the wall(s).

While the common wall is built “tight”, the air sealing techniques typically employed for the home’s exterior envelope should be reduced for the garage exterior walls and the overhead door to allow the exchange of garage air with air from outdoors to help ventilate the garage.

Ventilating Construction Areas: Certain construction activities, such as application of paints and varnishes, adhesives, vinyl flooring and carpeting, require that the area be ventilated during these activities and for a period following.

A fan should be placed in a window or exterior door as close to the work area as possible, and any openings in the window or door around the fan be temporarily sealed with plastic or cardboard. Then open a window or exterior door at the opposite end of the room or building, so that fresher outdoor air will flow across the work area and sweep polluted air out through the exhaust fan.

The size of exhaust fan needed will increase as the size of the room increases, and as the amount of gases being released into the air increases. The fan should provide about 5 air changes per hour (5 ACH). Divide the volume of the room in cubic feet by 12 to establish the minimum amount of cubic feet per minute (CFM) that the fan must be able to exhaust. For example, an 18 ft. by 15 ft. room with 8 ft. ceilings equates to 2,160 cubic ft., and when divided by 12 results in a minimum fan rating of 180 cfm. Make sure that the box fan you select meets this minimum rating; if the source of vapors is particularly strong or if you need to ventilate multiple rooms, a larger capacity fan will be required. As a rule of thumb, dust or smoke released into the air should be seen to be drawn towards the exhaust fan. As long as the odors or air pollutants are present, the temporary exhaust ventilation must continue to be operated, even during nights and weekends if necessary. Ventilation should continue for a minimum of 24 hours after completion, or until there are no longer any noticeable odors.

Flush out Air Contaminants: A “flush out” is when large amounts of outdoor air are forced through a recently completed home so that the majority of pollutant emissions from building materials, finishes, and furnishings can be removed before occupancy. The recommended minimum volume of outdoor air needed for flush out is the amount needed to ventilate the entire home at least once each hour (1 ACH, or air change per hour). This should continue 24 hours a day, 7 days a week, and begin as soon as final finishes such as paints and floor products such as carpeting have been installed and continue two weeks. If occupancy occurs before the two-week period is complete, the homeowner should be advised to complete the process

Owner’s Checklist/Manual: The following are some examples of issues that can be addressed in a checklist or manual. In the case of carpeting and moisture, suggested wording has been provided. Please provide input regarding how these listed issues should be addressed and note other issues that should be included.

- **Moisture and carpeting:** Periodically check under carpeting placed over the concrete slab in a basement for signs of dampness, especially during periods of wet weather,. In all areas of the home, if there is a plumbing water leak or significant water spill in the area, the underside of carpet and padding should be inspected for unseen moisture. In a matter of a few days moisture trapped below a carpet can quickly result in mold growth and release mold spores and mold metabolic products. (Should references providing advice for clean-up of mold be added?)
- **Labeling of equipment:** Clear labeling of all controls to operate equipment should be provided, as well as explanations of maintenance procedures. Heating and cooling equipment (incl. filters and AC drain pans), ventilation equipment, hot water heaters, etc. should be included. Annual servicing, where appropriate, should be emphasized.
- **Fireplace operation and maintenance:** If a fireplace is installed, it’s operation and effects on the home should be explained.
- **Rainwater control:** Describe the importance of maintaining gutters, downspouts and catchment systems and how this is accomplished.
- **Foundation water control:** Explain the operation and periodic inspection and maintenance of the sump pump and the importance of its function.
- **Home moisture and chemical control:** Explain the importance of controlling sources of moisture within the home. Also, explain how to manage sources of chemical pollutants to maintain good air quality.

- Termite protection: Explain the importance of protecting the home against termite damage by maintaining barriers and continuing regular treatments of the foundation areas by a certified pest control operator.